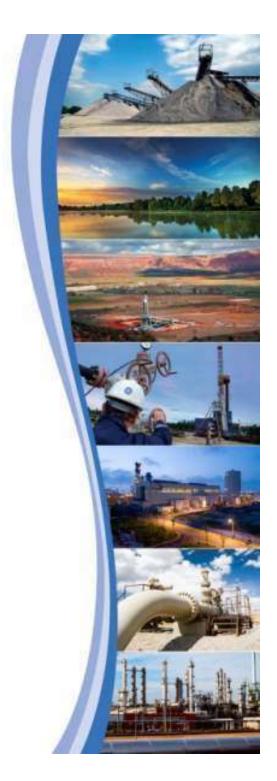
# GE Power & Water Water & Process Technologies

# **GE Water in Unconventional Gas**





# GE Energy businesses

### ecomagination<sup>®</sup>

82,000 employees - 140 countries 25% world's electricity from GE technology



#### **Power & Water**

- Thermal power gen
- Renewables
- Gas Engines
- Nuclear
- Gasification
- Water treatment
- Process chemicals

#### **Energy Services**

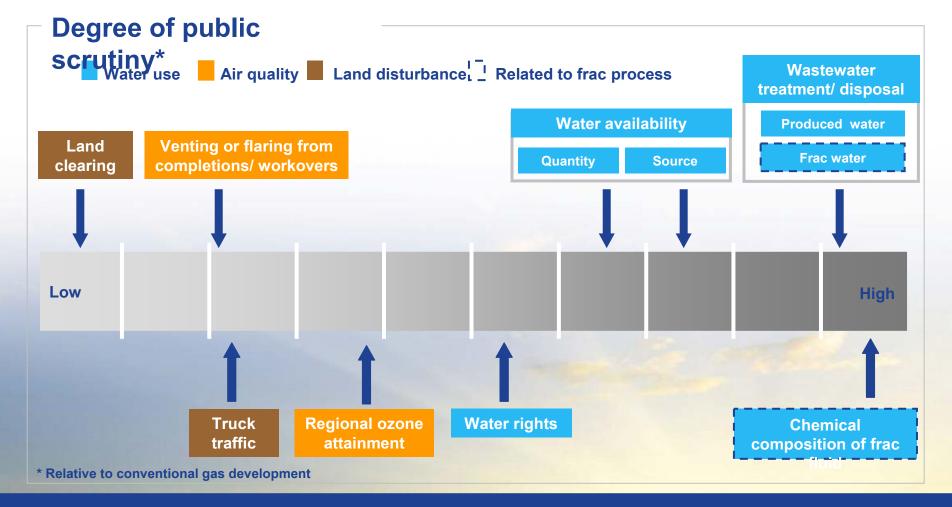
- Maintenance agreements
- Smart Grid
- Field services
- Parts and repairs
- Optimization technologies
- Plant management

#### Oil & Gas

- Drilling/production for ... land, offshore, subsea
- LNG and pipelines
- Refining/petrochemical
- Industrial power gen
- Complete lifecycle services



### Public concern over environmental issues



Water issues take forefront of national debate



# Regulatory risks

Water rights

**Tariffs** 



Discharge options

Waste disposal

Stringent regulations

**Permitting** 

Emerging pollutants

Ash ponds

# Physical/Operational risks

Availability

Quality



**Demand** 

Knowledge gaps

Access/ Allocations Outage impacts

Shift from air to water

**Efficiency** 

## Reputational/Social risks

Brand impact

Media sensitivity

Complianc e violations



Supply chain

Long-term fate

Employee impact

### Financial risks

Direct costs

Indirect costs



Energy costs

Waste treatment

Water pricing

"Next best" alternative

**Incentives** 

Bond rating

### Frac-water ... broad range of issues

Regulatory oversight expanding in key areas

### Fresh water requirements

- Water price increases doubtful ... water scarcity not a concern for most shale gas plays
- Desire to push producers toward use of non-potable source water

#### Injected water issues

- Emerging issue, but injected water depth is far below base of groundwater
- Liability on contamination of surface aquifers

#### **Produced water**

- Increasing exposure to new state and federal legislation
- Heightened scrutiny from local stakeholders
- Limited capacity at municipal water treatment
- Long trucking distance for disposal

<1 % of total U.S. water withdrawal coming from oil and gas industry in 2005

Source: IMF 2008, USGS 2009

"It does not take an imaginative leap to envision a future of fracing-related law suits"

Source: S.Dvorkin, O&G Journal May 24, '10

ExxonMobil Shareholders Strongly Support Disclosure of Natural Gas 'Fracing' Risks

Source: PRNewswire-USNewswire/May 26 '10

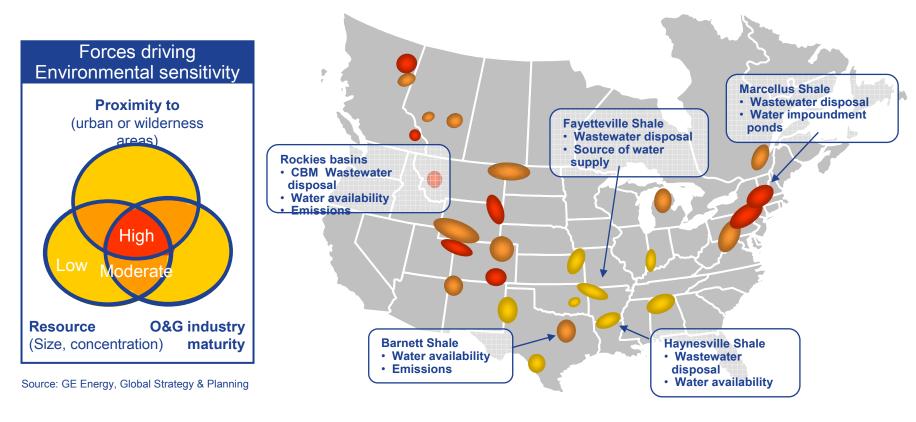
EPA foresees being given authority to put stricter regulations on fracing

Source: P.Silva, EPA Office of Water, personal communication



### Environmental focus stronger in some regions

Large gas plays, in close proximity to urban or pristine areas with little local familiarity to the O&G industry are likely to draw the most intense scrutiny





### **GE Solutions**

#### Offerings -

Pretreatment
Solution - Mobile Ultra
Filtration systems



#### **Water Reuse**

**Solution -** Mobile and fixed thermal evaporators with service contract



### Disposal Well Treatment

**Solution -** One Pass filtration and chemicals



# Flexible Business Customers Model

- ✓ Producers
- √ Service Providers
- ✓Independent Project Developers (Central Plants)

#### **Delivery Model**

- ✓ CAPEX sale with service contract
- √ BOO & Mobile contracts
- √ Select open consortium turnkey



# Converting waste into value

Enabling tough to treat solutions...





# Solution components





Mobile solutions















Beneficial reuse

Agricultural Utility
General irrigation

Permanent solutions



